

# Scientific Communication CITS7200

Computer Science & Software Engineering

## Lecture 2

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### A guide to writing in English

We will now look at some particular aspects of writing in English. Many of the points we make here are relevant to writing in Computer Science, but also have a broader usage. Virtually every rule about the English language has an exception, and not all experts agree on the rules. The rules we discuss in this lecture are all designed to either help you avoid ambiguity in your writing, or to produce a lively and attractive writing style.

### 1 Avoiding ambiguity

#### 1.1 Ambiguous sentences

Sentences should be readable from left to right without ambiguity, that is, it should be possible to parse the sentence unambiguously as it is being read, rather than only at the end of the sentence. Here are some bad examples:

- † Smith remarked in a paper about the ambiguity of data.
- † In the study of robotics, vision and artificial intelligence are dealt with at length.
- † The compiler did not accept the program because it contained errors.

A safe-sex guide issued by the Australian Government included “a table on which sexual practices are safe”!

## 1.2 Dangling participles

A participle is a verbal adjective qualifying a noun but retaining some properties of the verb.

For example, “Referring to your email, I reply to inform you that ...” The participle is “referring”, qualifying the noun “email”, and its intended subject is “I”. If we think about this in terms of agents and their actions, the agent in the above sentence is “I”, and the action, actually carried out by the agent here, is the “referring”.

In the following example, the participle does not match its intended subject:

† Substituting (*a*) into (*b*), the algorithm simplifies as follows:

Here, the substitution is done by the reader, *not* the algorithm. In this case, the agent and the action do not match and the reader is left with (a possibly sub-conscious) feeling of insecurity. This is an example of a dangling participle. Here are some others:

† When deriving parallel algorithms, the model of computation must be carefully considered.

Is “when deriving” attached to the reader, or the model?

† Having decided to navigate the robot using stereo vision, the question will be...

Is “having decided” attached to the researchers or the question?

## 1.3 Distinctions

The following words are often confused. Make sure that you use them correctly.

**Alternate, alternative.** *Alternate* means to move repeatedly between two things, whereas an *alternative* represents one of many options.

Of the many alternatives available for implementing this algorithm, one involves alternating between the minimum and maximum values in the search.

**Compare with, compare to.** You will generally want to use *compare with* in technical writing, when analyzing similarities and differences between things. *Compare to* states a resemblance between things, and usually has a poetic touch.

Shall I compare thee to a summer's day?

Compared with an English summer, an Australian winter merely has shorter days.

**Compose, comprise, constitute.** *Compose* means to make up, *comprise* means to consist of. Thus “comprised of” (= consisted of) is always wrong. *Constitute* is a transitive verb used in the reverse sense of the other two.

This course is composed of 13 lectures. This course comprises 13 lectures. Thirteen lectures constitute this course.

*Comprise* and *include* are also often confused. *Comprise* is appropriate when what is in question is the content of the whole, and *include* when it is the admission or presence of an item. With *include* there is no presumption that all or even most of the components are mentioned; with *comprise*, the whole of them are understood to be in the list.

The alias **year4** includes the honours students, but comprises all fourth year graduate students in the department.

**Less, fewer.** *Less* refers to a quantity (analog), whereas *fewer* refers to a number (discrete).

There are fewer oranges than apples, although the apples are less tasty.

†There are less than five algorithms currently available for optimising this sort of variable.

**That, which.** With regard to these words, the rule is that *that* defines and restricts, whereas *which* informs and does not restrict.

Consider the lattice  $L$ , which is complete.

Extra information is being given about this particular lattice; it is complete.

Consider the lattice  $L$  that is complete.

Now, from a collection of lattices, focus on a particular  $L$ , one that is complete.

Try to replace *which* by *that* whenever it sounds right to do so. If you have a good understanding of comma punctuation, all you need to know is that which-clauses are set off by commas.

- † The mechanism which permits networks to learn is modification of the effect of the synapse.  
The mechanism that permits networks to learn is modification of the effect of the synapse.

## 1.4 Punctuation

We will consider the following types of stops encountered in writing: the comma, the semicolon, the colon, the full stop, and the new paragraph.

- A *comma* is a punctuation mark of the least separation indicated between parts of a sentence.
- A *semi-colon* is used as the chief stop of intermediate value between a comma and a full-stop. It separates two or more related clauses.
- A *colon* is a punctuation mark ranking between a semi-colon and a full-stop. The phrase before a colon is general; the phrase after it is particular. A colon is used especially to mark antithesis, illustration, or quotation.
- A *full-stop* marks the end of a complete sentence, containing a subject, object and finite verb.
- A new paragraph generally marks a change of subject.

When the subject is the same for both clauses in a sentence, and the subject is expressed only once, then no comma is needed.

...the computation times were measured and recorded.

Knuth's writings are entertaining and full of interesting examples.

However, when the subject is the same for both clauses and is expressed only once, a comma is useful when the connective is *but*.

Knuth's writings are entertaining, but are lacking in interesting examples.

When the subject is expressed once more, use a comma before a connecting *and* and *but*.

Knuth's writings are entertaining, and they are full of interesting examples.

Place a comma before a conjunction, introducing an independent clause.

- † The network modeled the behaviour of the brain and the digestive system was completely ignored.
- † Each node sums the inputs and outputs a '1' if the sum is positive. The early data have disappeared, and it is no longer easy to reconstruct the results. The computation is complex, but there is a possible simplification if 1 is replaced throughout by  $\sin^2(x) + \cos^2(x)$ .

In a series of three or more items with a single conjunction, use a comma after each item except the last. This is called a *serial comma* or the *Oxford comma*.

Red, white, and blue are the colours of the French flag.

The textures determined in this image are wood, salt and pepper, and Hessian.

Work done independently by Jones, Lee and Tsui, and Forkaras [18,22,3] demonstrates that this problem is  $\mathcal{NP}$ -complete.

In this latter example, it is common to use an ampersand (&) connecting the joint authors:

Work done independently by Jones, Lee & Tsui, and Forkaras [18,22,3] demonstrates that this problem is  $\mathcal{NP}$ -complete.

Enclose parenthetic expressions between commas.

The best way to use this computer, unless you are playing games, is with keyboard data entry.

Do not break sentences in two, using full-stops where commas should be used.

† Knuth is an entertaining writer. A man with a wonderful repertoire of examples.

Do not join independent clauses by a comma when each clause is grammatically complete. Use a semi-colon where you could just as well use a full-stop.

Knuth's writings are entertaining; they are full of interesting examples.

If a list contains commas within the items, ambiguity can be avoided by using semi-colons as the list separator.

The data include binary, floating, and complex images; integers and reals; and arrays of images.

Use a colon after an independent clause to introduce a list of particulars, an antithesis, an illustration, or a quotation.

A dedicated programmer requires three skills: touch typing, critical analysis, and the ability to survive on little sleep in a malnourished state.

Stops are used to end sentences, but are also used in abbreviations, acronyms, and ellipses. When these occur at the end of a sentence, the sentence's stop is omitted.

This algorithm runs for 10 secs.

A proof by induction *does not* consist of proving the base case, then the case of  $n = 1$ , then the case of  $n = 2, \dots$  It uses a much more sophisticated form of logic.

It is not usual to put a stop at the end of a heading.

A punctuation mark is embedded within quotation marks only if it was used in the original text, such as when a complete sentence is being quoted.

Marr [2] argued that “biological vision systems are an inspiration for computer vision”, although Faugeras [12] disagrees: “Computer vision should focus on solutions to engineering problems; it should not be restricted by biological implementations in its search for optimal algorithms.”

## 2 Writing forcefully

### 2.1 Use the active voice

Your writing will sound more lively and forceful if you use the active, rather than the passive, voice. The active voice expresses phrases in the form “X did Y”, whereas the passive expression is “Y was done by X”. Unfortunately, many technical writers use passive after passive sentence, so that their writing becomes very dull. The active voice is more likely to grab your reader’s attention, and to make your work sound as if it were done by real people, rather than by pointers to some bibliographic database. Even worse than passive voice is the construction where the agent of the action is missing altogether.

Here are some examples:

**No agent** Two of these algorithms have been shown to terminate.

**Passive** Two of these algorithms have been shown by Jones [2] to terminate.

**Active** Jones [2] has shown that two of these algorithms terminate.

**Passive** The data were obtained with help from Internet users who responded to my request for their experiences of JPEG.

**Active** I obtained the data from Internet users who responded to my request for (information about) their experiences of JPEG.

**Passive** A simpler division is provided by Westervelt [9] who suggests that there are two kinds of GIS users.

**Active** Westervelt [9] provided a simpler division when he suggested that there are two kinds of GIS users.

First look to see whether any action described in a sentence is matched with its corresponding agent. If so, look for passives with “by” (see the second

example). There, the construct “was done by X” can be easily transformed to “X did”.

**Passive** The central CPU was provided by a network of SUN workstations.

**Active** A network of SUN workstations provided the central CPU.

Phrases that contain “was” can also indicate passivity. Look out for “was performed”, “was computed”, and “was calculated”. Another indirect style arises from the use of words such as “perform” and “utilize” to create the impression of scientific writing.

**Passive** Tree structures can be utilized for dynamic storage of terms.

**Active** Terms can be stored in dynamic tree structures.

Occasionally the passive voice is entirely appropriate, as it gives the right emphasis to the sentence.

A recursive version of this algorithm was given by Hudson [2] in 1985.

Here, the correct emphasis is on the recursive version of the algorithm, not the person who gave it.

## 2.2 What to call yourself

The word *we* is useful to avoid the passive voice, but it means either “me and the other authors of this paper” or “you and me together”, not “I”. Thus, if you write “it was hypothesized that . . .” it is difficult for the reader to know whether the hypothesis has been made by previous researchers, or the author or authors of the paper. Thus, “we hypothesize . . .” is much better. In a thesis, “I hypothesize . . .” is perfectly acceptable; in a paper by a single author it is more common to find expressions of the form “this paper introduces the hypothesis that . . .”, but it is a wordy and ambiguous statement. Generally, “I” is avoided in technical writing, unless your personal opinion is relevant to the argument, but its usage is becoming more common as readers insist on clarity.

## 2.3 Adjective and adverb use.

The *Concise Oxford Dictionary* makes the following definitions:

- adjective - the name of an attribute, added to the name of a thing to describe the thing more fully.
- adverb - word that modifies or qualifies an adjective, verb or other adverb, expressing a relation of place, time, circumstance, manner, etc.

Use an adjective only if it is necessary. The adjective should describe the noun more fully, for example, “the *mobile* robot”. Here are some examples of poor adjective use:

† The calculation requires great analytic skill and should be written up with meticulous care.

The effect of these adjectives (“great” and “meticulous”) is to undermine the nouns they serve.

Try to avoid words like *very*, *rather*, *quite*, *nice* and *interesting* in technical writing: “the proof is very easy”; “this is an interesting algorithm”.

Do not use tautological adjectives: *grateful thanks*, *true facts*, *definite decisions*, *unexpected surprise*.

The adverb “essentially” should be used with care.

† My aim this year is essentially to obtain a first class Honours degree.

You either get it or you don’t. The “essentially” should be removed.

## 2.4 Sentence starters

Avoid starting sentences with *There is* or *There are*. They make weak openings to your writing.

† There are several dynamic programming methods used for the stereo matching problem.

Researchers have tried various dynamic programming methods for the stereo matching problem.

## 2.5 Rhythm

Sentences have a definite spoken rhythm - always read aloud what you have written and change the wording if it does not flow smoothly.

† Read aloud what you have written always,  
and if it does not flow smoothly change the structure.

Always read aloud what you have written and,  
if it does not flow smoothly, change the structure.

## 3 Summary

### Rules for Writers

Don't use contractions. Remember to never split an infinitive. The passive voice should never be used. Do not put statements in the negative form. Verbs has to agree with their subject. Proofread carefully to see if you words out. If you reread your work, you can find on rereading a great deal of repetition can be avoided by rereading and editing. A writer must not shift your point of view. And don't start a sentence with a conjunction. (Remember, too, a preposition is a terrible word to end a sentence with.) Don't overuse exclamation marks!! Place pronouns as close a possible, especially in long sentences, as of 10 or more words, to their antecedents. Writing carefully, dangling participles must be avoided. If any word is improper at the end of a sentence, a linking verb is. Take the bull by the hand and avoid mixing metaphors. Avoid trendy locutions that sound flaky. Everyone should be careful to use a singular pronoun with singular nouns in their writing. Always pick on the correct idiom. Last but not least, avoid cliches like the plague; seek viable alternatives.